PATENT SPECIFICATION

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395,919

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COMPLETE SPECIFICATION.

Method and Apparatus for Making the Cutting Edges of Thin Razor Blades.

(A communication from abroad from AKTIEBOLAGET TONSOR, of Gothenburg, Sweden, a company organised under the laws of Sweden).

I, CECIL EDWARD EVERY-CLAYTON, a British Subject, of 51 and 52, Chancery Lane, London, W.C. 2, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The cutting edges of thin razor blades for safety razors have hitherto usually been made by grinding the two edges of the piece of work or blank to cutting edges of wedge form by means of grinding wheels. Grinding has been effected in two or more stages, the cutting edges being first rough-ground and then re-ground. Further treatment such as hardening, re-grinding, lapping, polishing, honing and so forth was then effected.

The grinding of the cutting edges led to the wearing out of a large number of grinding wheels. Moreover great care had to be exercised in the grinding operation in order to ensure that the material at the point of grinding did not become heated to such an extent that its hardness was adversely affected. It was necessary to grind in thin layers so as to avoid the formation in the grinding wheels of grooves which would make the grinding surfaces unserviceable. The grinding wheels had frequently to be turned round in order that a uniform grinding surface might be maintained continuously. It was difficult, on account of the unavoidable unequal wear of the grinding wheels, to obtain cutting edges which were disposed exactly symmetrically; on the contrary the cutting edges were usually not exactly in the middle plane.

The invention relates to a method for making the cutting edges of thin razor blades and also to a tool for carrying it out. The invention aims to avoid the above-mentioned difficulties and disadvantages in the grinding of the cutting edges; to make the cutting edges simply and cheaply; and to make a cutting edge which is absolutely even and at the same time is disposed exactly symmetrically with a simultaneous improvement of the structure of the material at the points worked upon.

The method according to the invention consists in chamfering the blade blank on the two appropriate edges by a pressing or stamping operation which is effected before the usual treatment such as hardening, grinding, lapping or polishing takes place. There takes place therefore an operation in which the cutting edges are produced, not by removal of material as in rough-grinding, but as a result of its displacement. Grinding is now restricted to the re-grinding operation in which the grinding wheels, as they no longer have to act on a sharp edge of the blade blank, are subjected to relatively little stress This re-grinding operation may be considerably accelerated because the cutting edges are no longer heated to the same extent as when a relatively large amount of material has to be removed. The substantial improvement of the material at the cutting edges is also of advance because as a result of the pressing or stamping operation the structure becomes fine-grained.

The pressing or stamping of the cutting edges may be carried to such an extent that a proper edge is formed and thus the second grinding operation may be dispensed with. The method according to the invention makes the production of razor blades substantially cheaper as grinding and therefore the most expensive operation is partly or wholly dispensed with.

The method according to the invention is applicable to the making of the blades from separate blanks as well as to the continuous manufacture of the blades from a blank in the form of a band.

When the blades are made from a continuous steel band then, according to a further feature of the invention, notches which determine the shape of the blade are first stamped out of the edge of the band, whereupon the cutting edges are formed on the remaining longitudinal edges by the pressing or stamping operation and the usual further treatment then effected. It is thus possible for the

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material to extend to a certain extent during the pressing or stamping operation so that the formation of waves in the cutting edges as might occur if the pressing or stamping operation were carried out on an uninterrupted band, is avoided.

The invention furthermore includes a stamping tool for carrying out the method of forming the cutting edges by stamping or pressing. This stamping tool is rotatably mounted in its holder in such a manner that its pressure surface follows the deformed material during its displacement. In this way undesirable compression of the material during stamping is avoided.

Further features of the invention will appear from the description which follows and are pointed out in the claims.

In order that the invention may be clearly understood and readily carried into effect it will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a sectional view on an enlarged scale illustrating diagrammatically the pressing or stamping process according to the invention;

Figure 2 is a plan view of a portion of a steel band illustrating the forming of the blade shapes as a result of the removal of notches of material, while

Figure 3 is a sectional elevation of an example of a stamping tool made in accordance with the invention.

Referring to Figure 1 of the drawings, the blade blank 1 is arranged between two press jaws 2 and 3. The lower press jaw 2 is arranged to be immovable while the upper press jaw is displaceable in the direction of the arrow 4. It is pressed against the blade with a pressure which may amount for example to from 40,000 to 50,000 kilogrammes. The press jaws have the desired chamfer or bevel along a length 5 which corresponds approximately to the breadth of the cutting edge. When the press jaws approach one another the material is pressed out sideways so that a sharp edge is formed at 6.

The stamping of the cutting edges and the stamping out of the holes or slots which serve for the guiding or holding of the blade are preferably combined into one operation.

The devices which are necessary for the pressing of the cutting edges are relatively simple and cheap so there is a substantial saving in the cost of making the cutting edges. In addition there is the improvement of the material at the cutting edges and the production of a rectilinear and exactly symmetrical apex.

Figure 2 illustrates a portion of a steel band as employed in the continuous production of razor blades. All of the operations which are necessary for the finishing of the blades are carried out on the steel band, the individual blades being then separated from the band. Before the carrying out of the stamping operation as a result of which the cutting edges 7 of the blades 8 are formed, notches 9 are stamped out in the band and these determine the individual blade shapes. In order to facilitate the subsequent separation of the individual blades, depressions 10 may at the same time be formed between the adjacent blade blanks. It is then only necessary in order to produce the cutting edges to subject the edge lengths 11 to the stamping operation. It is possible for the material to extend in the longitudinal direction of the band during the stamping of the cutting edges 12 so that the formation of waves in the cutting edges is avoided. Moreover distortion of the blades is avoided and the length which has to be subjected to the stamping process is reduced by the length of the notch.

The tool illustrated in Figure 3 effects the simultaneous stamping of both cutting edges of the razor blades and is suitable for operating on individual blade blanks or on a blank in the form of a band. It comprises an upper stamp carrier 13 and a lower stamp carrier 14. Both stamp carriers are secured and guided in the press in any convenient known manner The two stamp carriers are arranged to be movable towards one another. The blade 15 is shown of an exaggerated thickness for the sake of clearness. The left-hand edge 16 of the blade is shown in the unstamped, the right-hand edge 17 in the stamped condition. A stamp 18 with a retaining-head 19 of cylindrical form, which head takes the pressure during stamping, is provided in the stamp carrier for each of the four inclined edges of the blade, each stamp being rotatable about the axis of this head. Resilient insertions 22 are provided between the outer faces 20 of the stamps and the inner faces 21 of the stamp carrier. These insertions, when the stamps are in the unloaded condition, press them inwards towards guides 23 and 24, between which the separate blade blanks or the band blank are or is led. When the stamping process begins during the moving down of the upper stamp carrier 13, the stamps are at the same time forced outwards by the material which moves outwards as a result of the compression. This motion is made possible by the manner in which the stamps are mounted in their holders. The arrangement of the stamp carriers in the press may be as de-

sired, without any change being made in the manner of operation. Instead of the two stamp carriers being moved towards one another as described above, the lower stamp carrier might be arranged to be immovable and the upper stamp carrier capable of being moved towards it. In that case it would be necessary to arrange for the lower guide 23 to move downwards when the carrier 13 moves towards the carrier 14.

I am aware of Specification No. 15,341 of 1901 which describes a method of forging or shaping metal consisting in impinging against the metal in a heated condition suitably-shaped dies, and then rolling the same toward and upon each other to produce a tapering cutting edge. It is however, not concerned with the making of thin safety razor blades.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A method for making the cutting edges of thin blades of the kind employed in safety razors in which the blade blank is chamfered on its two cutting edges by a pressing or stamping operation which is effected before the usual treatment such as hardening, grinding, lapping or polishing takes place.

2. A method for making the cutting edges of thin razor blades according to Claim 1, in which the two cutting edges are formed simultaneously.

3. A method for making the cutting edges of thin razor blades according to claim 1 or claim 2, in which the blade blank is chamfered to such an extent that grinding may be altogether dispensed with.

4. A method for making the cutting edges of thin razor blades according to claim 1, 2 or 3, and wherein the blades are produced continuously from a band, in which the blade shapes are first determined as a result of the removal of notches of material and the cutting edges are subsequently formed by a pressing or stamping operation on the remaining longitudinal edges, the usual further treatment then taking place.

5. A stamping tool for carrying out the method of any of the preceding claims, in which the stamps are rotatably inserted in their holders so that their stamping surfaces are able to follow the displacement of the deformed material during stamping.

6. A stamping tool according to Claim 5 in which the surfaces of the stamps which take the pressure are of cylindrical form.

7. A stamping tool according to claim 5 or 6 in which the stamps are resiliently urged into the initial position as for example by means of insertions of resilient material between the sides of the stamps and adjacent surfaces of their holders.

8. A stamping tool according to any one of claims 5 to 7 in which four stamps are provided for the simultaneous stamping of both cutting edges of the blade, the four stamps being mounted in two carriers, and two guides are provided between the stamps for guiding the blade blanks or band.

9. A stamping tool for carrying out the method of claim 1, 2, 3 or 4, constructed as shown in Figure 3 of the accompanying drawings and adapted to operate as hereinbefore described.

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Fig. 1.

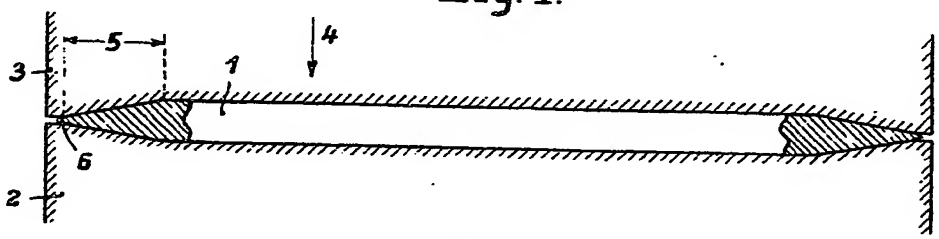


Fig. 2.

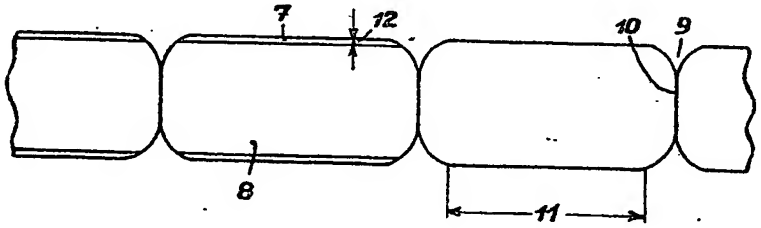
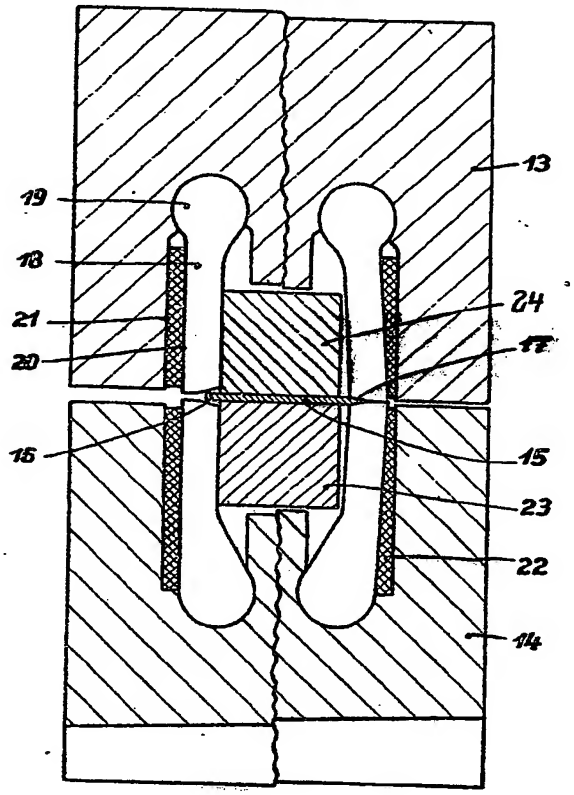


Fig. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

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